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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/564,755

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Norishige Nanai

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EXAMINER

NGUYEN, CUONG QUANG

ART UNIT

PAPER NUMBER

2811

MAIL DATE

DELIVERY MODE

04/12/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/564,755	Applicant(s) NANAI ET AL.	
	Examiner CUONG Q. NGUYEN	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27-55 is/are pending in the application.
- 4a) Of the above claim(s) 35,38-45 and 53-55 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 27-34,36,37 and 46-52 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>10-21-09, 03-22-07, 01-08-07, 03-27-07, 01-17-06</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restriction

1. Applicant's election without traverse of embodiment IV, claims 27-34, 36-37 and 46-52 is acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 27-31 and 46-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukamoto et al. (US 7,282,742).

Regarding claim 27, Tsukamoto discloses a field effect transistor comprising: a semiconductor layer through which carriers injected from a source region travel toward a drain region, the semiconductor layer being formed from a composite material comprising an organic semiconductor material and nanotubes, wherein the nanotubes are each circumferentially coated with the organic semiconductor material in the semiconductor layer (col.6 lines 21-35). See Fig.1.

Tsukamoto does not explicitly teach that the nanotubes are each circumferentially coated with the organic semiconductor material in the semiconductor layer and the mixture ratio of the nanotubes to the whole semiconductor layer is 30 to 90% by volume.

It would have been obvious to one of ordinary skill in the art to provide volume percentage of nanotubes in the organic semiconductor material as claimed because the percentage of nanotubes in the organic semiconductor material would have been determinable by one of ordinary skill in the art through no more than routine experimentation. See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Regarding claims 28, 29, Tsukamoto teaches that plural ones of the nanotubes are joined with each other in the semiconductor layer. See col.7 lines 10-13.

Regarding claims 30, 31, 46, 47, Tsukamoto teaches that the nanotubes are carbon nanotubes and the organic semiconductor material is a polymer-type organic semiconductor material.

Claims 27-34, 36-37, and 46-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirai et al. (US 6,794,220) in view of Tsukamoto et al. (US 7,282,742).

Regarding claim 27, Hirai et al. discloses a field effect transistor comprising: a semiconductor layer through which carriers injected from a source region travel toward a drain region, the semiconductor layer being formed from a composite material comprising an organic semiconductor material. See Fig.1f.

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Hirai does not explicitly teach that the composite material comprising the organic semiconductor material and nanotubes wherein the nanotubes are each circumferentially coated with the organic semiconductor material in the semiconductor layer and the mixture ratio of the nanotubes to the whole semiconductor layer is 30 to 90% by volume.

Tsukamoto et al. teaches that the composite material comprises the organic semiconductor material and carbon nanotubes.

It would have been obvious to one of ordinary skill in the art to incorporate the carbon nanotubes into the composite material as taught by Tsukamoto in order to increase the mobility of the carriers in the organic semiconductor material (see Tsukamoto col.3 lines 1-40). It would have been also obvious to one of ordinary skill in the art to provide volume percentage of nanotubes in the organic semiconductor material as claimed because the percentage of nanotubes in the organic semiconductor material would have been determinable by one of ordinary skill in the art through no more than routine experimentation. See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Regarding claims 28, 29, Tsukamoto teaches that plural ones of the nanotubes are joined with each other in the semiconductor layer. See col.7 lines 10-13.

Regarding claims 30, 31, 46, 47, Tsukamoto teaches that the nanotubes are carbon nanotubes and the organic semiconductor material is a polymer-type organic semiconductor material.

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Regarding claims 32, 34, 48, 50, Hirai et al. teaches that the polymer-type organic semiconductor material is a thiophene-type material (see col.5 lines 55-65) or acene-type material (see col.5 lines 45-50).

Regarding claims 33, 49, it is noted that, as above, the organic semiconductor material in Hirai et al. is identical as the organic semiconductor material as claimed , so the organic semiconductor material in Hairai et al. would inherently possess a low-molecular-weight organic semiconductor material as claimed.

Regarding claims 36-37 and 51-52, as shown in Fig.1f, the field effect transistor is formed on a plastic sheet or a resin film substrate. See col.2 lines 55-60.

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cuong Nguyen whose telephone number is (571) 272-1661. The examiner can normally be reached on 8:00 am to 5:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on (571) 272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

4. Information regarding the status of an application may be obtained from the

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Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Cuong Q Nguyen/

Primary Examiner, Art Unit 2811

4/12/2010